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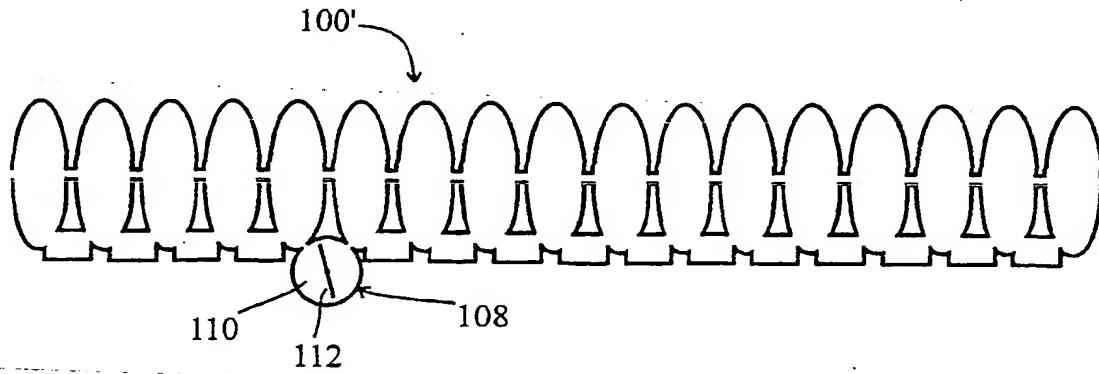
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(71) Applicant (for all designated States except US): ELEKTA AB (publ) [SE/SE]; P.O. Box 7593, S-103 93 Stockholm (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): ALLEN, John [GB/GB]; 65 Edward Road, Haywards Heath, West Sussex RH14 4QL (GB). BRUNDLE, Leonard, Knowles [GB/GB]; 63 Pasture Hill Road, Haywards Heath, West Sussex RH16 1LY (GB). LARGE, Terry, Arthur [GB/GB]; "Arley", 5 Beckworth Lane, Lindfield, West Sussex RH16 2EH (GB). BATES, Terence [GB/GB]; 75 Smith Barn, Horsham, West Sussex RH13 6DT (GB).

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(57) Abstract: An accelerator comprises a plurality of accelerating cells arranged to convey a beam, adjacent cells being linked by a coupling cell, the coupling cells being arranged to dictate the ratio of electric field in the respective adjacent accelerating cells, at least one coupling cell being switchable between a positive ratio and a negative ratio. Such an accelerator in effect inserts a phase change into the E field by imposing a negative ratio, meaning that the beam will meet a reversed electric field in subsequent cells and will in fact be decelerated. As a result, the beam can be developed and bunched in early cells while accelerating to and/or at relativistic energies, and then bled of energy in later cells to bring the beam energy down to (say) between 100 and 300 KeV. Energies of this magnitude are comparable to diagnostic X-rays, where much higher contrast of bony structures exists. Hence the accelerator can be used to take kilovoltage portal images. A suitable structure for the switchable coupling cell comprises a cavity containing a conductive element rotatable about an axis transverse to the beam axis, as for example set out in our earlier application PCT/GB99/00187. The application also relates to the use of such an accelerator and an operating method for such an accelerator.

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